

2017 AWWA Water Audit Level 1 Validation

Water System Name: Santa Clarita Water Division

Water System ID Number: 1910017

Water Audit Period: Fiscal Year 2017/18

Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

- Establish organization workgroup to review and manage water loss
- Supply meter testing and calibration
- Customer meter upgrades and replacement to AMR

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Utility Provided

Steve Cole

Assistant General Manager



09/27/2018

Executive Name (Print)

Executive Position

Signature

Date

Water Audit Level 1 Validation Document

Audit Information:

Utility: Santa Clarita Water Division PWS ID: 1910017
System Type: Potable Audit Period: Fiscal Year 2017/18
Utility Representation: Leticia Quintero, Matt Dickens, Eunie Kang, Keith Abercrombie, Adam Pontius, Elizabeth Ooms-Graziano
Validation Date: 9/19/2018 Call Time: 10:00am Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 64 Data Validity Band (Level): Band III (51-70)
ILI: 1.37 Real Loss: 29.31 (gal/conn/day) Apparent Loss: 17.62 (gal/conn/day)
Non-revenue water as percent of cost of operating system: 4.4%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

Validator Information:

Water Audit Validator: Will Jernigan, P.E. Validator Qualifications: Contractor for CA-NV AWWA Water Loss TAP

Validator Provided

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity/Grade
1	Volume from Own Sources	VOS	7	Supply meter profile: Water production comes from 14 groundwater wells that have a combination of mag and propeller meters. VOS input derived from: Manual reads from production meters as archived. Updated input to reflect SDs. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of own supply metered: 100% Signal calibration frequency: Conducted by staff – estimated every 6 months. Documentation not available for review. Volumetric testing frequency: Annual testing regiment as of 17-18 FY. Volumetric testing method: Insertion type by McCalls. Percent of own supply tested and/or calibrated: >90% Comments: No additional comments.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	Input derivation: Volume weighted average from test data. Net storage change included in MMSEA input: No. Comments: No additional comments.	Supply meter read frequency: Daily. Supply meter read method: Manual. Meters tied to SCADA but not totalizing. Frequency of data review for trends & anomalies: Each business day. Storage levels monitored in real-time: Yes. Comments: Net storage change as limiting criteria for DVG.
3	Water Imported	WI	5	Import meter profile: Water is imported through 13 connections with Castaic Lake Water Agency. The meters are owned and serviced by CLWA. WI input derived from: Totalization of volumes per manual redundant meter reads by utility. Cross referenced export tables from CLWA, and determined that Saugus Well volumes were not included. Updated WI input to account for this. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of import supply metered: 100% Signal calibration frequency: None. Volumetric testing frequency: Annual testing regiment as of 17-18 FY, but were only able to conduct tests on some of the import meters. Volumetric testing method: Insertion type by McCalls. Percent of import supply tested and/or calibrated: 57% Comments: DVG limited by testing <90% of supply volume.
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	4	Input derivation: Left blank in absence of analysis of test data. Comments: No additional comments.	Import meter read frequency: Daily (by SCWD). Import meter read method: Manual. Meters tied to SCADA but not totalizing. Frequency of data review for trends & anomalies: Monthly. Comments: No additional comments.
5	Water Exported	WE	n/a		
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a		
7	Billed metered	BMAC	7	Customer meter profile: Customers are primarily residential, industrial, and irrigation. Meter population includes multi-jet and mag meters.	Percent of customers metered: 100% Small meter testing policy: Reactive - complaint based or flagged-consumption testing only.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
				Age profile: The replacement schedule is based on the size and age of meters. Large meters have an average age of 5 years. Small meters have an average age of 10 yrs. Reading system: Manual and AMR. Moving towards an AMI system with migratable AMR installs. Read frequency: Monthly. Comments: Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed (including irrigation codes N, O P, Y).	Number of small meters tested/year: Small number randomly selected, with a small number of reactive tests as well. Large meter testing policy: Targeted testing is conducted annually for high volume meters – randomly selected. Number of large meters tested/year: Small number of meters randomly selected, quantity limited by resource availability. Meter replacement policy: Small meters on a 20 year changeout historically, but also have been on a conversion program for last 5-6 years. Number of replacements/year: ~2,000 as part of conversion project. Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle. Comments: No additional comments.
8	Billed unmetered	BUAC	n/a		
9	Unbilled metered	UMAC	n/a		
10	Unbilled unmetered	UUAC	5	Profile: Portion of operational flushing that is unmetered and fire department usage. Comments: Flushing activities greatly scaled back due to drought. Custom California default of 0.25%xWS utilized.	Comments: Default grade applied.
11	Unauthorized consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer metering inaccuracies	CMI	7	See BMAC comments regarding meter testing & replacement activities. Input derivation: Calculated as simple average from analysis of field data. Data sets are very limited in size. Comments: Recommend using a volume weighted approach between large and small meter results. Additionally it is recommended to expand the test sample sizes as feasible.	Characterization of meter testing: Routine (proactive), but not fully representative. Characterization of meter replacement: Ongoing (proactive), annual. Comments: DVG based on calculated input from random but less than representative sampling.
13	Systematic data handling errors	SDHE	5	Comments: Default input applied.	Comments: Default grade applied.
14	Length of mains	Lm	9	Input derivation: Totaled from CAD based map. Hydrant leads included: Yes. Comments: GIS System in development. In 2014, utility personnel went through the system and GPS validated every above ground piece of infrastructure in the system.	Mapping format: Digital. Asset management database: Not currently in place but in development. Map updates & field validation: Accomplished via specific efforts for asset inventory, outside of normal work order processes.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade	Comments: No additional comments.
15	Number of service connections	Ns	9	Input derivation: Detailed query from billing system to analyze unique record count. Basis for database query: Location or other premise-based ID. Comments: Query known to omit services with vacant meter boxes. This amount is known to be less than 1% of to service connection count.	CIS updates & field validation: Accomplished through normal meter reading processes. Estimated error of total count within: 1%. Comments: No additional comments.	
16	Ave length of cust. service line	Lp	10	Comments: Default input and grade applied, as customer meters are typically located at the property boundary given California climate.		
17	Average operating pressure	AOP	10	Number of zones, general profile: There are 17 pressure zones in the system, some of which are gravity fed and some are pressurized with booster pumps. Typical pressure range: 40 - 178 Input derivation: Calculated as weighted average from analysis of field data, supported by hydraulic model. Comments: No additional comments.	Extent of static pressure data collection: Hydrant pressures taken during routine system flushing and/or hydrant testing. Characterization of real-time pressure data collection: Full-scale - telemetry or pressure logging (including seasonal variations) in place beyond the boundary points in all zones representing full pressure profile. Hydraulic model: In place and calibrated within the last 5 years. Comments: No additional comments.	
18	Total annual operating cost	TAOC	10	Input derivation: From official financial reports. Comments: Confirmed costs limited to water only, and water debt service included.	Frequency of internal auditing: Annually. Frequency of third-party CPA auditing: Annually. Comments: No additional comments.	
19	Customer retail unit cost	CRUC	8	Input derivation: Total consumptive revenue divided by Billed Metered Authorized Consumption. Sewer charges are not applicable. Comments: No additional comments.	Characterization of calculation: Weighted average composite of all rates. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.	
20	Variable production cost	VPC	5	Supply profile: Own sources and import supply. Primary costs included: Treatment chemicals, supply & distribution power, and purchase costs. Secondary costs included: None currently included. Comments: No additional comments.	Characterization of calculation: Primary costs only. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.	

Key Audit Metrics

(~)	VALIDITY	Data Validity Score: 64	Data Validity Band (Level): Band III (51-70)
(#)	VOLUME	IL: 1.37	Real Loss: 29.31 (gal/conn/day)
(\$)	VALUE		Annual Cost of Real Losses: \$562,082
			Annual Cost of Apparent Losses: \$526,660

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Much installed in 1960s/70s, estimated average

Infrastructure replacement policy (current, historic): Annual budgeting for service line replacements, driven by high failure frequency.

Estimated main failures/year: 10-15 Estimated service failures/year: 100-125

Extent of proactive leakage management: A pilot leak detection program was in place for a small portion of the system but did not discover a notable amount of leakage.

Other water loss management comments: No additional comments.

Comments on Audit Metrics & Validity Improvements

The Infrastructure Leakage Index (ILI) of 1.37 describes a system that experiences leakage at 1.37 times the modeled technical minimum for its system characteristics. The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating cost-effective interventions for water & revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Improved understanding of Supply Meter (Own or Import) Master Meter Error: consider adopting or increasing the rigor of a source meter volumetric testing and calibration program, informed by the guidance provided in AWWA Manual M36 – Appendix A.
- Temporal alignment of Billed Metered Authorized Consumption with Water Supplied: consider pro-rating the first and last months of the audit period to better align consumption with actual dates of use, and using read date as basis for reporting.
- Customized estimate of Unbilled Unmetered Authorized Consumption: consider producing itemized, agency-specific estimates of unbilled unmetered (operational) uses, rather than using the default. Ensure leakage estimates are excluded.
- Improved estimation of CMI: consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.

Further Recommendations

Since Data Validity Score is >50, consider follow-on implementations as described in the AWWA M36 Manual (see following page), once the annual water audit is established:

- Conduct Uncertainty Analysis to determine Margins of Error on Water Balance components
- Conduct Advanced Validation as warranted by Margins of Error
- Conduct a Real Loss Component Analysis to develop your leakage profile.
- Conduct an Apparent Loss Component Analysis to develop your apparent loss profile.
- Cost-benefit analysis & target setting for water loss components.
- Design & implement water loss control program for cost-effective interventions

M36 - The Big Picture: Economic Intervention

